SCIENCE.

FRIDAY, JANUARY 15, 1886.

COMMENT AND CRITICISM.

LIKE ALL CITIES which have not seriously grappled with the subject of municipal taxation, Baltimore has been suffering for years from the inequality of assessment, escape of personalty from taxation, the difficulty in enforcing payment, and the practice of many persons who do business in the city, of residing part of the year in the country, and thus withdrawing personal property from taxation. To remedy matters, a commission was appointed last summer to investigate the question; and during the past week a report has been made, of more than local interest. No opportunity was given for radical changes, as the state constitution, which requires that all personal and real property shall be taxed on a uniform basis, stands in the way. The committee favor the creation of sixteen city assessors, to be appointed without regard to politics, and with a tenure of sufficient length to secure expert service. The assessors are to constantly review both real and personal property, and prevent evasions. Property is to be assessed up to its full value, and the system of discounts for prompt payment of taxes is to be abolished. On the other hand, as an aid to the poorer classes, taxes may be paid quarterly. Professor Ely of Johns Hopkins university, who is one of the commission, adds a supplemental report, looking to a change in the constitution. He would abandon the attempt to tax all personal property, and attempt only to reach such classes of personal property as bank shares, for instance, which can be assessed without discrimination. The larger proportion of personal property should be taxed only by indirect means. Real estate should be taxed at one uniform rate; all incomes in excess of six hundred dollars per annum; so, also, all rents of dwellings, taking as a basis three times the annual rent of dwellings, in lieu of miscellaneous personal taxes; and the rental value of all stores, offices, manufacturing establishments, and other places of business, the rent being fixed at ten per cent. He recommends a special heavy taxation on retail and wholesale liquor-dealers, and finally favors the plan of deriving all state taxation from corporations and licenses, thus leaving real estate for local purposes.

TYPHOID-FEVER is a disease which has too long been permitted to exist without a well-directed effort to diminish its ravages. Although the specific micro-organism to which it is due is not so definitely ascertained as in the case of tuberculosis, still there are but few who question the relation of cause and effect between some microbe and the disease. It is also conceded that this germ is given off in the excreta of the patient, and that the spread of the disease is caused by the inhalation of air containing the germ, or by the imbibition of water, milk, or other fluid which has become contaminated with the infected dejections. In rural districts, where the water is derived from wells which are often but a few feet from the out-house, there is no difficulty in understanding how the infection might pass from the vault to the well, and how those who partake of the water might contract the disease. In large towns and cities, however, where the water-supply is from a distance, and the ground from which it is obtained free from such contaminating influences, the propagation of the disease must be accounted for in some other way. Particularly is this so, when, as frequently happens, the disease prevails in restricted sections, and is absent elsewhere, while the water consumed is the same for all sections. Manifestly the starting-point for an investigation is the infected excreta, if the accepted theory is the true one. If these could be followed and their route ascertained, more especially if the course pursued by the infectious element could be traced, the mystery would disappear, and the problem be solved.

Recent observations made in Brooklyn, a report of which has appeared in the daily press, point to the sewers and the drain-pipes of the houses as the channels by which the disease finds its way from one house to another, and clearly indicates that the plan to be pursued, based on our knowledge of the history of the disease, is to throttle it at the start by thoroughly disinfecting the discharges of typhoid-fever patients before they are thrown into the drains or into the out-houses.

Special attention has been directed in Brooklyn, during the past fall, to having this measure efficiently carried out, supplemented by repeated washings of the public sewers, in the districts specially affected, with a solution of chloride of lime. Shortly after these measures were inaugurated, the disease declined; but whether this was in any degree attributable thereto or not, cannot be decided until further observations are made. Thus far, a preliminary report only has appeared, but a fuller one is promised. It is well worthy the attention of all health authorities to follow out this or a similar plan of action; so that, if possible, a disease which caused in England alone thirty-six thousand deaths in six years, may be brought under control, and its spread confined within narrow limits. The report also recognizes the connection between defective plumbing and the spread of the disease (for, unless there were defects within the house, no infection could enter, even though the public sewers might be infected), and recommends the disconnection, by means of running traps, of all houses from the street-sewers, and the provision for full and free ventilation of both sewers and drains. Special stress is, however, laid upon the disinfection of the discharges within the house; for, if this is thoroughly done, neither the house-pipes nor the public sewers can become infected.

ONE OF THE MOST CURIOUS and important facts regarding the use of oil at sea in stormy weather to calm the waves is its apparent novelty to seamen. When in the last extremity, some of them 'happen to think of oil,' and, on trying it, find that the sweeping waves no longer break over their decks, and that the vessel rides with comparative ease where it labored heavily before. This is much as if a captain 'happened to think of the rudder' when he wished to shape a new course. The hydrographic office is accomplishing an excellent work in popularizing the practical value of this simple means of escaping danger.

A NEW JOURNAL is to be issued in France under the title *Archives de l'anthropologie criminelle et des sciences penales.* The study of criminals, from an anthropological and a psychological point of view, is due to the Italian school of which M. Beccaria was the founder, and which is now ably represented by MM. Sombroso and Ferri. The French interest in this subject is borrowed from Italy, and undoubtedly the French journal will aid in disseminating this interesting as well as scientific method of studying these defective classes.

THE U. S. S. RUSH sailed, Jan. 2, for the Aleutian Islands, in the hope of rescuing the crew of the missing whaler Amethyst, which it is thought might be there and in need of assistance. The winter climate of the Aleutians, though stormy, is rarely very cold, and the harbors are open all the year round. Most of the islands are uninhabited, and, from the absence of large animals, afford little food for a wrecked party, if cast ashore there. The visit of the Rush may save life, and prevent much suffering. The winter ice-line generally includes the Seal Islands, and it is likely that the Rush will not be pushed beyond the Aleutians, unless the weather be unusually favorable.

THE CITY OF MEXICO, for a number of months past, has been afflicted with a scourge of mosquitoes. These insects have prevailed to such an extent that they have been a constant theme of discussion, and have, in a number of instances, caused sickness, and, it is said, even death, by their poisonous bites. Official bulletins have been issued by the director of statistics, Dr. Peñafiel, seeking information as to their habits, natural history, etc. Singularly, the species, which is a large one, has not been known, or at least has not attracted attention before the past year; and fears are entertained that the pest is of recent introduction. The varying abundance of different kinds of insects during different years renders such a view improbable; yet it is significant that the present species is new to science, never having been described by entomologists.

IN CONNECTION WITH the article on the Russian railroads in central Asia, given on another page, it is interesting to note the following Berlin despatch to the London *Times:* "A government circular has been sent to all the newspapers, forbidding them to publish reports about the construction of military railways, the movement of troops, and other kindred matters, statements on such subjects being the exclusive privilege of the official organ of the war minister."

THAT THE PRACTICE of cremation is extending is to be inferred from the numerous references

which are made to new crematories by the daily press of this country and Europe. In France a very important advance has been made, as the prefecture of the Seine has decided to spend $40,000 for a crematorium in the great Parisian cemetery, Pêre Lachaise. Dr. G. Pini has recently published a book on 'La cremation en Italie à l'étranger de 1774 jusqu'à nos jours,' which shows that in Italy but little progress had been made until the cremation of the body of Albert Keller on the 22d of January, 1876, about which time a society of three hundred was organized at Milan, which published a circular giving urgent reasons for the practice. Thirty-one societies existed at the date of publication of Dr. Pini's work, in the principal cities of Italy, and 394 bodies had been submitted to disposal by fire in the crematories erected by those societies, mainly in Milan, Lodi, Brescia, and Rome. More than three-fourths of this number were cremated at Milan. The chief point worthy of comment in the present law relative to the Society of Milan, is its method of dealing with the only valid objection which has ever been urged against cremation; namely, the possible concealment of crime. The clause in question reads as follows: "If the cause of death is 'incertaine, suspecte, imprévue, ou violente,' the cremation of the body must be preceded by an autopsy." In this country a pamphlet has recently been published by the Worcester, Mass., cremation society, written by Dr. Marble. His argument might fitly be named, as he states, 'The dangers of earth-burial.' He cites many instances to prove that the graveyard is an objectionable institution for sanitary reasons. Chief among the resulting evils he places the pollution of water-supplies. A Massachusetts act was passed in 1885, authorizing the formation of societies for cremating the dead, and contains a provision for the prevention of the concealment of crime similar to that in force in Milan.

RAILROAD TO MERV, BOKHARA, AND SAMARKAND.

WHILE the attention of the world has been engaged upon the Servian-Bulgarian disputes, the Russian engineers have been pushing on the Trans-Caspian railroad, and transforming this mysterious Asia into a Russian province. This road, one of the wonders of our age, which commences at the Caspian Sea, is already opened three hundred and eighty kilometres, to within eighty kilometres of Askabad, and was to be opened to that place in December, 1885.

The grading of the road is finished to Dushak, one hundred and fifty kilometres south-east of Askabad. At this point the road will branch. The Indian branch will be built to Saraks, about two hundred kilometres, where it will connect with the English road from Quetta, through Afghanistan, making the great road to India. The other branch will run north-east into central Asia, crossing the Amu Daria, and running through Bokhara to Samarkand.

This line has been commenced, but it will take at least three years to complete it. It passes through Merv, and will be finished to that place next spring. From the Caspian Sea to Merv is about six hundred kilometres, and thence to the river Amu Daria is about five hundred kilometres.

The road to Dushak crosses a small portion of the Great Desert from the Caspian Sea, about one hundred kilometres, to the great range of mountains that separate Persia from Turkestan, thence along the foot of this range of mountains, through a tolerably well-watered region, to Dushak. Here it crosses the steppes of the Great Desert, towards those broad plains whence Attila, Genghis Khan, and Tamerlane led forth their armies to overrun Europe.

All the materials for the railroad, even the wood for its construction, come from the interior of Russia. Some of the workmen come from beyond Smolensk in Russia, near the borders of Poland; others are the war-like Tekkes and Turkomans, of whom nearly eight thousand have been employed upon the road; while more are seeking employment than are required.

The horses are purchased in the steppes of Kirghiz, one thousand kilometres east from Merv, while their drivers are the Cossacks from the district of the Don, two thousand kilometres west.

Water, which is wanting almost everywhere in these vast steppes, is collected in the oases. It is frequently muddy and sometimes salt, and is then purified by powerful filters, and pumped through pipes, which furnish it to the laborers, thirty kilometres distant. Coal and wood for fuel are wanting; but petroleum has been discovered in almost unlimited quantities, and is used for locomotives and steamers.

The Russian colony lives in ambulant villages, moving along as the work progresses, carrying with it the commissariat, stores, and offices, and a collection of such articles as may be required for the work or the workmen. The telegraph precedes the railroad; and already Merv, Samarkand, and Bokhara are connected by wires with

St. Petersburg, and thus civilization is carried to the oldest of the Aryan tribes.

The Russian merchants are opening warehouses along the line of the railroad, and supplying the inhabitants of the desert on the north, to Khiva, Bokhara, and Samarkand, and the Persians to the south. They have established entrepôts at Merv and Pendjeh, which are already supplying the inhabitants of Herat with Russian manufactures and stores.

In America the locomotive carried with it the emigrants who inhabited and cultivated the land. In Asia the locomotive is retracing the paths which the human race trod in its early days, and carries with it all the wonders that the race has gathered up in its long journeyings. This desert was once the garden of the world; but first wars, and then constant incursions of the Turkomans, have devastated it. The character of the Turkomans we learn from Vambéry, who says in one of his books that they "have the well-deserved reputation of sparing nobody, and would even sell the prophet himself into slavery if he should fall into their hands;" and in another that they have a proverb which says, "If you see a party attacking the house of your father and mother, join them in the plunder and robbery." Now brigandage and slavery have been to a large degree suppressed, and under the Russian rule the old irrigating canals will be re-opened, and this great desert, rich when watered, will be as densely populated as in the early ages. Thus the railroad will become the civilizer of the old world, as it has been of the new. GARDINER G. HUBBARD.

GEOGRAPHICAL NOTES.

Late news from Alaska. — A weekly newspaper, the *Alaskan*, has been started at Sitka. It is a neat quarto, and intended to gather information about the territory, and promote its development. It is the fourth newspaper which has actually been printed in Alaska, though several periodicals treating of Alaskan matters have been issued at San Francisco in past years. The *Alaska times*, a large quarto, edited by T. G. Murphy, appeared in May, 1868, and existed about two years during the military occupation. Some of the numbers were printed on brown paper for want of other material. This was followed in 1875 by a little folio sheet printed on the press of the single military company then left at Sitka, and named the *Alaska bulletin*. About seven fortnightly numbers appeared; and in October, 1876, a similar issue, under the name of the *Sitka post*, was begun, and terminated with its fourteenth number, on the final removal of the troops from Sitka. The present publication is of a more serious character than its predecessors, and the seven numbers which have reached us contain many items of interest which might otherwise have been lost. A weekly summary of the meteorology is furnished by the local signal officer. On the 12th of December, the editor notes that the temperature was stationary at 45° F., and he received a cabbage, cut that week in one of the local gardens, untouched by frost, and of which the solid head measured about fifteen inches in diameter. A canoe express took the weekly issue from Sitka to Juneau in three days, the distance being about 180 miles. A new town, to be called Edwardsville, was going up near the mines on Douglas Island. The Treadwell mine, though somewhat hampered by a scarcity of water, turned out $75,000 in bullion in the last month, and the owners were enlarging its facilities. The Silver Bay mines near Sitka had been taken in hand by a company of capitalists. The oil-works at Killisnoo were running to their utmost capacity, and sent down by the last steamer 300 tons of herring-oil. M. E. Hess, writing from Fort Reliance, says that the natives make portages from that place to the Tananah River in eight days. From the head of the latter to the Copper River they go in from four to seven days. The Tananah heads so near the White River that the Tenan Kutchin Indians cross with their furs, and build a raft, on which they descend the White River to the Yukon, and the latter to Fort Reliance, where they trade, thus drifting about four times the direct distance from their homes to the fort. Mr. Hess had concluded to winter on the White River. He reports gold in placers and in quartz in several places, and also what he supposes to be nickel ore. The prospectors on the Lewis River made from $200 to $500 per man on the bars of that river during the short summer. They report the climate as resembling that of Montana.

The Sakeis of Malay peninsula. — The last annual report of the British resident at Selangore, Malay peninsula, contains some notes on the curious tribe called Sakeis, of whom there are about eight hundred persons. They are divided into nine sections, whose chiefs are called Batins. They live chiefly by collecting rubber and other products of the jungle. They have no formal religion, but are very superstitious, believe in good and bad auguries, consider certain birds sacred, and abandon any settlement where one of them dies. They tattoo the arms by way of ornament, but the tattooing has no tribal or totemic significance. Nothing capable of being eaten comes amiss to them: even scorpions and snakes are acceptable. They kill game by darts, poisoned

with the juice of the upas-tree, projected from a hollow cane, and, for very large game, use a bamboo bow and arrows. They live in bamboo huts about eight feet high, thatched with palm-leaves. They are ugly and timid, but inoffensive. They wear the hair flowing, instead of tied up as the Malays do, and are shorter than the latter, but resemble them in other physical characters. They are gradually becoming accustomed to Europeans; and one or two Malays are attached to each community, on the part of the government, to protect the people from injury or imposition.

The Malpais in Michoacan, Mexico. — Carlos Naulleau has visited the Malpais in Michoacan, Mexico, and from his account we extract the following notes of interest: The Malpais is situated four leagues from Panindicuaro, and is a region four leagues long and two wide, covered with fantastic emissions of a now extinct volcano. The pinnacles and blocks resemble a ruined city, and are so rough and angular that one would need steel armor to make one's way among them unwounded. There are many caverns, natural pits, and shafts to be avoided. The scene is extraordinary: the twisted and sombre rocks are destitute of the smallest sign of vegetation. It is said that in this retreat the ancient Indians fortified themselves against Cortes and his followers. The place is a natural citadel, within which, it is asserted, the aborigines built themselves a town surrounded by a triple wall with only one entrance. One legend states that thousands found a refuge here, and that the place was twice visited by a pestilence, the second time only sixty persons escaping to Zacapu. There, in the library of the Franciscan fathers, the Rev. Fermin Martinez, who has given the subject much study, has found some records relating to the fugitives. Among the higher parts of the confused masses of lava are several structures formed like teocallis, surrounded with a narrow stairway, and connected with each other by paths made of blocks of lava. There are also several ruined houses in different places. The most remarkable teocalli measures at the base thirty-five by twelve varas, and is fifteen varas high. It has been excavated for antiquities. At a depth of three or four varas were found several small cells built of adobe, each containing a skeleton with a small jar of pottery, many arrow-heads, and a few knives made of obsidian. The investigations were interrupted by banditti, who doubtless supposed that treasures of gold or jewels were being secured by the diggers.

Return of Aubry. — Aubry, who for two years and a half has been travelling in Shoa, Galla- and Somali-land, on a mission from the Ministry of public instruction, has safely returned to Paris. His companion, Dr. Hamon, succumbed to fever on the eve of his return, and died by the Hawash River, between the Abyssinian mountains and the Gulf of Aden. Aubry was obliged to fight to escape the Somalis. In the confusion his collections of zoölogy and botany were lost; the mineralogical and geological collections, however, were saved, as well as all his note-books, maps, etc. The results of his work will soon be made public.

ASTRONOMICAL NOTES.

Comet 1885 V (Brooks). — We learn from Mr. Barnard of the Vanderbilt observatory, Nashville, Tenn., that he found this comet independently on the evening of Dec. 27, 1885, and telegraphed immediately to Swift his discovery, receiving in reply the announcement that he had been anticipated one day by Brooks. Mr. Barnard had resigned on the 30th of August, 1885, the zone ($+15°$ to $-45°$) originally allotted to him, and carefully watched since 1882; and it was only in casually devoting a few hours to the field in which he has been so successful that he picked up the new comet. An orbit computed by Chandler and Wendell shows that the comet is decreasing in brightness, having passed perihelion on Nov. 29, 1885.

The Lick observatory. — Professor Holden has written an interesting article for the *Overland monthly*, sketching the history of the observatory to the time of his taking charge. In regard to the immediate inception of astronomical work, he says, "It is of the first importance to find some means of paying the salaries of one or two observers for the years 1886 and 1887, in order that the magnificent equipment may be at once put to its legitimate uses. No great sum is required, but a few thousand dollars at this time would be of real service." It is stated that the first volume of publications of the 'Lick observatory of the University of California' is now in course of preparation, under the direction of the Lick trustees, by Capt. Richard S. Floyd and Professor Holden.

NOTES AND NEWS.

WE take the following from Governor Robinson's message to the Massachusetts legislature: "Although no legislation seems to be needed upon this subject [topographical survey], it will not be inappropriate to emphasize the importance of the work, and to commend its successful prosecution under the direction of the state commissioners, acting in co-operation with the U. S. geological survey. During the year 1885 about two

thousand five hundred square miles, nearly one-third of the area of the state, have been covered. The cost of the field-work will very nearly correspond with the original estimate of ten dollars per square mile. Of the $15,000 appropriated last year, the sum of $12,750, or about $5.14 per square mile, has been expended. The United States has also made an outlay, by the coast and geodetic survey, in behalf of the commonwealth, of nearly $1,300 in the triangulation of the valley of the Connecticut River. This sum has been supplemented by $470.47 out of the state appropriation, in the determination of the boundary-lines of cities and towns, for which the triangulation is the basis. The city and town boundary survey has been commenced in the counties of Suffolk, Norfolk, Plymouth, and Bristol; and it is expected that the work will be continued, and extended into other counties, during the current year, with all practicable despatch. I commend to your favorable consideration the reasonable requirements of the commission, in order that you may provide the means to meet the necessary outlay."

— The long voyage of the derelict schooner 'Twenty-one friends,' as reported on the latest 'Pilot chart,' now extends from March 24, off Hatteras, to Dec. 4, when it was entering the Bay of Biscay, twenty-three observations having been made on it during the drifting passage.

— The *American* (Philadelphia) of Jan. 2 contains a readable article of a page on 'The New Jersey shore,' describing briefly its mild climatic features, which make it valuable as a winter sanitarium as well as a summer resort. Some account is given of the different types of beach which make up the coast there, and of the island near Cape May known as Five-mile beach. Here a neglected herd of cattle ran wild several years, and survived the winters, unprotected and unfed, except in the coppice and holly groves: the latter are remarkably fine on this island. The bays of Barnegat and Little Egg harbor are described as sunken meadows traversed by a network of submerged channels, and enclosed from the sea by long strips of sand beach and dunes.

— The prizes awarded at the annual meeting of the French academy, on the 21st of December, were as follows. Geometry: for general studies on the problems of excavation and embankment, divided between Mr. Appell and Mr. Otto Ohnesorge; to Mr. Emile Barbier the Francoeur prize. Mechanics: the grand prize of six thousand francs, for the progress of efficiency in naval forces, was divided among Messrs. Hélie and Hugoniot, for their treatise on experimental ballistics; Mr. Ph. Hatt, for his 'Suggestions on marine phenomena;' Mr. Lucy, for his geographical index; and Mr. Doneaud du Plan, for various works. Other prizes were given to Mr. Henri Poincaré, for his mathematical works; Mr. Amsler-Laffon, for his construction of the instrument called the 'polar planimeter;' Mr. Bienaymé, for a work on the steam-engine; Mr. Daymard, for researches on the calculation and graphical representation of ships; Mr. Felix Lucas; and to Mr. Jean-Daniel Colladon, the Fourneyron prize, increased to the value of three thousand francs, for his 'Theoretical and practical study of hydraulic accumulators, and their applications.' Astronomy: to Mr. Thollon, for his chart of the solar spectrum; and to Dr. Spoerer, for his work on sun-spots. Physics: the Bordon prize, for researches on the origin of atmospheric electricity, to Mr. Edlund; and the Lacaze prize to Mr. Gernez, for various studies in chemical physics. Statistics: the Montyon prize was divided equally between Dr. P. de Pietra-Santa, for his 'Contributions to the study of typhoid-fever in Paris;' and Mr. O. Keller, for his statistics of mineral industry, etc. Chemistry: to Mr. Prunier, for his researches on the carburets of the American petroleums, etc.; and Messrs. R. D. Silva, G. Rousseau, and Prof. A. Ditte, for various researches. Geology: to Mr. de Lapparent, for his memoir on the country of Bray; and Mr. Alfred Caraven-Cachin, for his 'Geographical and geological sketch of the department of the Tarn.' Botany: to Messrs. Dubois, Heckel, and Schlagdenhauffen, for various researches; to Leclerc du Sablon, for his researches on the hepaticae; and to Mr. Patouillard, for his work on fungi. Anatomy and zoölogy: the grand prize to Dr. Joannès Chatin, for his unpublished work entitled 'Researches on the tactile organs of insects and crustaceans;' and to Mr. Paul Girod, for his studies on the cephalopods. Physiology: to Mr. Duclaux and Mr. Remy, — the latter for his nerve studies. Medicine and surgery: to Dr. L. H. Farabeuf, for a treatise on manual operations; Dr. Augustin Charpentier, for memoirs on the function of the retina; J. Regnauld and E. Villejean, for researches on the anaesthetic properties of formines, and their chloric derivatives; to Dr. E. Gavoy, for invention of the instrument named 'cerebrotome;' to Mr. P. Redard, for his works on military transportation of the sick, and medical thermometry; to Dr. Paul Topinard, for his anthropological works; to Dr. Mahé, for memoirs on the cholera; to Drs. L. Bouveret, Gabriel Pouchet, Émile Rivière, and A. Villiers, for various cholera studies; to Dr. Ernest Desnos, for 'Studies of a particular cause of urinary retention;' to Dr. Grasset, for a 'Practical treatise on the diseases of the nervous system.'

Other prizes were awarded to Mr. Ch. Girard, for various physical and chemical works; Mr. Van Beneden, for researches on the development of the lower animals; Mr. Bourbouze (photography); Mr. Sidot (chemistry); Mr. Valson; Mr. G. H. Halphen (mathematics); and Mr. Sappey, for his work entitled 'Anatomy, physiology, and pathology of the lymphatic vessels, considered in man and other vertebrates.'

— Letters had been received at Vienna, Dec. 29, from Professor Lenz, of the Austro-Hungarian Kongo expedition, dated Ango-Ango, Oct. 31. He announces his departure for Stanley Pool, his assistant, Dr. Baumann, having succeeded in obtaining at Nyombi 80 natives as porters. It is difficult to secure these auxiliaries. The French missionaries, who are also travelling up the Kongo, meet with even greater difficulties, their porters having run away. A similar misfortune has happened to the German expedition under Lieutenants Knuth and Tappenbeck. The health of the members of the Austro-Hungarian expedition is satisfactory, although the transition from the dry to the rainy season is very dangerous to Europeans.

— Why Labberton's 'Historical atlas' (New York, *Townsend, MacCoun*) should have reached an 'eighth edition,' is one of the mysteries of book-publishing in this country. The maps, many of them, are of the rudest description. In fact, so bad is the workmanship, that in some cases important cities are laid down miles away from their actual sites. Nor is the selection much better. There are sixteen maps of Britain, no less than twelve of which relate to a period anterior to the reign of King Aelfrid. The last of the set is a map showing the Norman conquest. Of England since 1071, nothing is given except a few miserable maps in the corners of the maps of Europe. The Puritan revolution is utterly ignored. The 'explanatory text,' so loudly announced on the titlepage, adds little to the worth of the book, while 'the carefully selected' bibliography can appear of value to those only who are ignorant of the literature of the subject. The maps showing the growth of our own country are based on such an inadequate knowledge of our history that they are little more than a mass of error. In fine, although the plan of the atlas is good, the selection and workmanship are so poor, that we lay it down as one of the most unsatisfactory books of the past year. Much better in every respect is the 'Standard classic atlas,' bearing the following imprint: "Copyright, 1885, by Ivison, Blakeman, Taylor & Co., publishers, New York and Chicago." The maps are well drawn, and admirably chosen. In fact, we were just beginning to congratulate ourselves on the advance which American map-makers had made during the last few years, when suddenly our attention was drawn to the following words, attached to map 18: "Engraved by Becker's patent on steel, Stationer's Court, London." So, after all, this is an English book which in some way or other these publishers have copyrighted. If such actions are legal, what need have we for an international copyright law? As to the book itself, it is a good one, and contains besides the maps a very useful alphabetical index, giving the position of about ten thousand places, with their ancient and modern names.

— To judge from the statements made in the introduction to a treatise on 'A system of iron railroad-bridges for Japan,' by J. A. L. Waddell, published by the University of Tokio, many of the iron bridges erected by foreign contractors, and now in use in Japan, are of inferior construction. Professor Waddell, who occupies the chair of civil engineering at the University of Tokio, has here aimed to make clear to Japanese engineers the method of designing the class of structures mentioned, and he has covered the ground in an extremely satisfactory manner, and with much minuteness of detail. The book must prove a great benefit to Japan by securing improved construction, and there is much in it that will be serviceable and suggestive to American engineers, even if they should not agree entirely with him in the discussion; for his devices and methods are not always those which are commonly employed in the United States. He analyzes in all its parts the American type of bridge as adapted to the conditions of the Japanese narrow-gauge railroads. He gives tables and strain-sheets, the preparation of which must have required a vast amount of labor, and which by themselves make a large atlas. Some portions of the memoir have appeared in this country as papers submitted to different technical societies. It is a most agreeable surprise to find that the University of Tokio endeavors to extend its usefulness by publishing treatises of so eminently practical a character.

WASHINGTON LETTER.

SCIENCE and the scientific have in some degree indulged in that suspension of activity which is the recognized privilege of the more serious occupations during the holiday season. Some of the societies have suspended their meetings for a period of two or three weeks. When they are resumed, the season's work will begin in earnest, as it is said that papers of considerable importance, growing out of the field-work of last summer, are nearly

ready for public presentation. The president of the National academy has spent a part of the vacation time in the city, largely on business connected with the affairs of the academy. The visit is timely, as it doubtless has enabled Professor Marsh, on various occasions, to express his views, and to some extent the views of the academy, on several questions of primary interest and importance to science and scientific men, which are just now coming before the national legislature.

Of these, one of the earliest to be brought forward is the proposition to establish a national university in accordance with the provisions of a bill introduced by Mr. Ingalls in the senate at its first session after the holidays. The idea of such an establishment is as old as the government itself, and it is said to have been recommended by every president from George Washington down, with the possible exception of Lincoln, whose time was so occupied with matters of greater moment and more immediate importance as to preclude its consideration. The bill was ordered printed and to lie on the table. It is said that senator Ingalls intends to make an argument in its favor in the near future. The measure will unquestionably have warm friends and strong opponents.

A leading member of the senate recently remarked that experience had convinced him that an appropriation of fifteen hundred dollars was sufficient to start a national university, and cited in proof that some of the scientific branches of the government now expending nearly a million dollars annually, were inaugurated with appropriations of one or two thousand dollars.

The subject of an international copyright law is likely to receive attention from congress at an early date. It was before the senate judiciary committee in the last congress, but in the early part of the present session it was referred to the committee on patents. It is said to be the intention of this committee to give the subject a thorough consideration, and that prominent exponents of both sides have been invited to express their views and arguments. The list includes many prominent American authors.

An experiment in the direction of securing communication between vessels at sea by means of electricity will be made at some time during the present week in the Chesapeake Bay. A board of naval officers, consisting of Commander Hoff and Lieutenants Reeder and Meigs, has been detailed to witness the trial. They will be accompanied by Prof. A. Graham Bell, who has long been interested in the subject, and who has himself experimented upon it.

The improvement of signalling by methods other than electric has for some time been under consideration, both in the army and the navy. A committee has been selected, consisting of General Hazen of the army, and Commander Hoff and Lieutenant Reeder of the navy, to report upon a more desirable code of signals for the service of the United States. It has been agreed to instruct a certain number of men in each of the codes used by the different governments of the world, and by a sort of competitive examination to determine which is the best. Improvements are also being made in heliographic signalling. Experiments at long range with various forms of apparatus are about to be undertaken under the direction of Lieutenant Purssell, in charge of the division of military signalling of the signal corps.

Although this system of signalling has come into almost universal use, there does not seem to have been any very decided advance in methods since the successful experiments of Moses G. Farmer in 1861. The signals are made by long and short exposures of light, to which system the dot and dash alphabet of Morse is easily applicable. At long distances, however, and under unfavorable atmospheric conditions, it becomes difficult to distinguish the long from the short, and a limit to the rapidity of transmission is soon reached. Lieutenant Finley of the signal corps has recently constructed a heliograph in which two mirrors, or two sources of light, are used, separated far enough to be readily distinguished by the reader of the message. The display of one of these only, means a dot, while the exposure of both at the same instant means a dash. This method promises to increase both the certainty and rapidity with which the message can be read; but its great advantage is that a vastly less amount of skill and training will be required in its working, on account of the nearly complete elimination of the comparison of time intervals.

In spite of the many attractions which Washington offers to the scientific worker, it now and then happens that the resultant of all the forces is in an opposite direction. There is more or less that is disagreeable incident to all government work, and unfortunately there is a more or less uncertain tenure of office, so that occasionally a college corporation carries off a man whose services the government ought not to lose. A recent example is that of Professor Gooch of the geological survey, who will leave his post here to become professor of chemistry in Yale college.

One or two other attempts of a similar character have been made within a few months; but the facilities for original research in certain directions, which are offered here, have prevented their being successful. Z.

Washington, D.C., Jan. 11.

LONDON LETTER.

THE application to the treasury, on behalf of the Marine biological association, to which reference was made in a former letter, has been very successful. An intimation has been received by the council that their lordships propose to submit to the house of commons an estimate which will grant to the association the sum of five thousand pounds, to be paid in two annual instalments, together with a yearly subscription of five hundred pounds for five years afterwards. This is as it should be, and the conditions imposed are practically nominal, as they entirely coincide with the intentions of the council. The accounts are to be formally audited, and afterward published; assistance is to be given to the solution of the economic questions connected with the British fisheries; and accommodation is to be afforded to investigators who may desire to work out definite problems of marine zoölogy. A resident superintendent has been found in the person of Mr. Walter Heape, who will enter upon his duties with the new year, and in preparation for them has already visited the chief American institutions of the same kind. He is well known as an embryologist, and has recently received the honorary degree of M. A. from the University of Cambridge, for his services as demonstrator of animal morphology. Having been brought up to a business life which promised to be one of considerable success, he deliberately relinquished it in order to devote himself to scientific pursuits; and in 1879 he was attracted to Cambridge by the high reputation of Mr. F. M. Balfour, who died three years later. But the impulse which Balfour had given to the study of morphology in the university was well sustained by his senior pupils, Sedgwick, Welldon, and Heape; the latter of whom will now have the opportunity, in the new laboratory at Plymouth, of doing very much to advance his favorite sciences of morphology and embryology.

A very interesting exhibition of the appliances used in geographical education has been recently opened under the supervision of the Royal geographical society. About eighteen months ago, Mr. J. S. Keltie (sub-editor of *Nature*) was appointed by the council of the society as an inspector of geographical education for the purpose of obtaining information respecting its position and methods by personal investigation, both in the United Kingdom and on the continent of Europe, and by correspondence as regards America. He has published an elaborate report, which has been recently issued as one of the society's supplementary papers; and the collection which he made of the various appliances used in geographical education is now on view. The exhibits ar classed as follows: 1. Wall-maps; 2. Globes; 3. Telluria, planetaria, etc.; 4. Models and relief-maps; 5. Geographical pictures; 6. Atlases; 7. Text-books; 8. Miscellaneous. The collection is one of great interest, though, as Mr. Keltie says, "it contains specimens of all gradations of quality. In all classes will be found objects which may be taken as examples of 'how not to do it.'" It is hoped that many schoolmasters may be induced to visit the exhibition during the Christmas holidays, and a series of conferences on the subject of geographical education has been arranged. Many eminent men at both the older universities are desirous of seeing geography formally introduced as a branch of scientific study. The appointment of a university teacher in the subject was suggested at Cambridge some time ago, and it is rumored that a similar step will soon be actually taken at Oxford. Should this prove to be the case, there can be no doubt that it would have a powerful influence in improving the position of geography in the public schools, where it receives, as a rule, from one to two hours weekly of more or less perfunctory teaching at the hands of men who have no special interest in their work, even if they are not absolutely opposed to it from its taking up time which they would like to see devoted to classics. At King's college, London, Prof. H. G. Seeley, F.R.S., is professor of geography.

The fact of the comparatively slow adoption of the electric light in England has already been mentioned in these letters, although the reasons thereof may not have been. The chief reason is to be found in the restrictions upon the development of the industry laid down by the electric lighting act of 1882. Until these are relaxed, no commercial company can light a district with any chance of financial success, owing mainly to what are known as the 'compulsory purchase clauses.' Within the last few days an official programme of legislation for next session has been put forward, and among the measures there named is a new electric lighting bill. The political prospect, however, is so disturbed, that the chances of any such domestic measure becoming law this session are very small.

In connection with this subject, it may be mentioned that there are well-founded rumors of a new form of battery, suitable for electric lighting, to which the inventors give the name 'primary' battery, but which is really a modification of the ordinary 'secondary' battery, for which it is claimed that its yield in ampère hours, per pound of lead, far exceeds any thing yet accomplished. Cells prepared in England have

been subjected to very severe tests in Paris by M. Hospitalier and other well-known electricians.

The 'juvenile lectures' at the Royal institution, first rendered popular by Faraday in his 'Chemistry of a candle,' are this year being given by Professor Dewar, who has chosen 'The story of a meteorite' as his subject.

The Corporation of Liverpool has just issued the programme of its twenty-first winter course of lectures, to be given in the rotunda lecture-hall of the Free public library. These lectures are paid for by the corporation, and admission thereto is absolutely free. The hall holds about sixteen hundred, and is usually well filled by the 'great unwashed' of Liverpool, on Monday, Tuesday, Wednesday, and Thursday of each week from Jan. 4 to March 11. The first lecture is by Mr. William Lant Carpenter, on 'Temperature and life in the depths of the sea.' Prof. Oliver Lodge, whose lecture on 'Dust' in Montreal will be remembered, and several of his colleagues in University college, Liverpool, as well as some of the professors in Stonyhurst college, are among the lecturers. It is greatly to be wished that other towns, on both sides of the Atlantic, would follow the example thus set. W.

London, Dec. 23.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

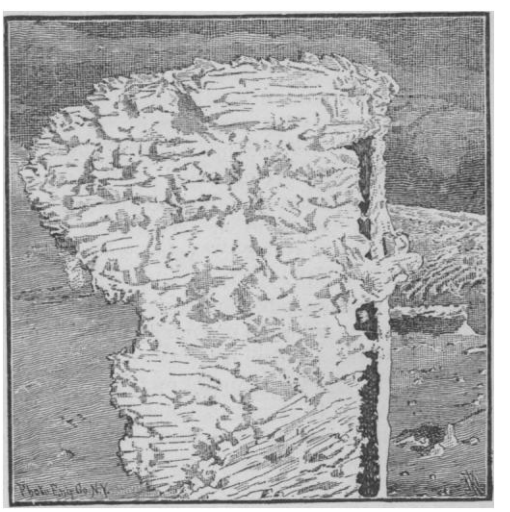
Eskimo building-snow.

I ENCLOSE a photograph, kindly sent me by General Loring, of the Boston Museum of fine arts, of snow impacted on a telegraph-pole, by a strong gale, near the summit of Mount Washington. It furnishes a good example, near home, of the texture of snow, under the influence of a fierce wind and intense cold, and will make clear some remarks I have previously made in your journal regarding the use of snow by the Eskimo among whom I travelled. In my description of the igloo (snow-house) of the Innuit in *Science* during the summer of 1883, I mentioned that the first snows that fall are not used by the Eskimo of my acquaintance to build snow-houses, the preliminary igloos being of ice for three or four weeks, until the deep drifts of snow had been subjected to very low temperatures and the 'packing' influences of strong winds. The winter weather of the summit of Mount Washington is in most respects essentially arctic.

In the accompanying illustration we see readily the peculiar texture or strong 'binding' power of the snow under those conditions of wind and cold, and it is now in a condition for an igloo snow-block. It is readily seen that it must have great cohesion to hold up such a heavy load on such a fragile support.

The cohesion of snow in our latitudes (and the early snow of the Arctic) is of a plastic, wet, or 'pasty' character, as shown in the making of snowballs, the formation of huge balls of snow on the ground as they roll along, snowmen, balling on horses' feet, etc. (also shown by Mr. Williams's letter in *Science* of March 6, 1885; Mr. Stone's letter of May 29, 1885, in *Science;* and others to you). This is essentially unfit for snow-building.

The snow fit for igloos is of a dry, almost stone-like character. The cutting of a thin portion from the side of an arctic snow-block, instead of giving a sheet of plastic snow as from a snowball, produces a shower of fine powder, exactly the same as from a large lump of loaf-sugar. In short, the arctic building snow-block stands in about the same relation to those we would make here, as the brick just from the mould, and before it is dried, bears to the same object when burnt in the kiln, and ready for use. The arctic snow-blocks ring like a well-burnt brick; and this is especially noticeable during intensely cold weather,



HARDENED SNOW ON A MOUNT WASHINGTON TELEGRAPH-POLE.

when I have heard a snow-block, as it was struck with a knife, give forth a clear, metallic, musical sound, not unlike the striking of a highly tempered bar of suspended steel with the hand, or other non-metallic substance.

I remember, when my natives were building a snow-house on the high 'divide' between Back's Great Fish River and Hudson's Bay, the thermometer in the minus 60's, a block of snow rolled down the hill for fifteen or twenty feet, and I doubt if a rolling guitar would have given forth many more confused musical tones than the bumping block as it struck and bounded along down the hard, stone-like bank of snow.

Yet it must not be inferred that this dry, compact snow has any of the characteristics of ice about it. It is not only much lighter than ice, but, I believe, lighter than the plastic snow we have, certainly not so dense as when made into the ordinary snowball. In fact, the least quantity of ice in the snow — which sometimes happens — renders it more or less worthless for building, according to the amount. In the late spring, banks of snow having southern exposures, and thawing slightly about noon, only to

freeze again, and others subject to drainage (and a few other causes), often have ice permeating the mass, sometimes in little fine needles, which make the mass worthless, and now and then in little crystals scattered through it. If these crystals are much larger than a pea, and more numerous than one to about every four square inches exposed by a section, the bank is rejected by the Eskimo snow-builder, unless others cannot be found.

The packing of the wind and low temperature are needed to produce the true building-snow, and, in the absence of either one of these conditions, the action of the other seems to be worthless. As to temperature, this is shown by the snow not being good, as judged by the Eskimo, until it is *ik-kee-oo-ad-lo* (very cold) despite the fiercest gales having occurred. It is shown as to the wind by not finding good building material in deep gorges, and other places where the wind cannot get at the snow to pack it down, long after it is perfect in other localities. My information on these points did not come from such observations, however, but directly from Eskimo explanations, and I add these to corroborate them. I do not believe—although I do not positively know—that both wind and low temperature must come together, but both must have happened before the Eskimo will use the snow for building, though possibly the two may be independent in time. When I say the Eskimo will not use it, I mean as a usual thing and in a general way; for in his cheerless country he is often driven to dire expedients, and does many things under a sort of polar protest.

After my detailed description of an Eskimo snow-house in *Science*, and some popular accounts in other periodicals, I learned in several ways (by correspondence and from accounts given me by the editor of *St. Nicholas*) of attempts to reproduce these domiciles in our country having ended in failure. Of course, the main reason of such failures was in the lack of knowledge to construct the igloo, the manual dexterity needed, it being an art which requires no small amount of the early life of an Eskimo to acquire to that perfection we often see among them; yet the builders who failed in their undertakings may console themselves with the fact that it is only in rare cases that the snow will be of the right texture in so low a latitude. The alpine districts, as Mount Washington in the winter, and similar places, might do. Ebierbing (Eskimo Joe, as he was known in the United States), my interpreter, told me that he had built a few igloos in the United States for the edification of curious crowds, but he was only too glad not to see them tumble in and ruin his reputation as well as the house; but, as to living in them, he would never have thought of it.

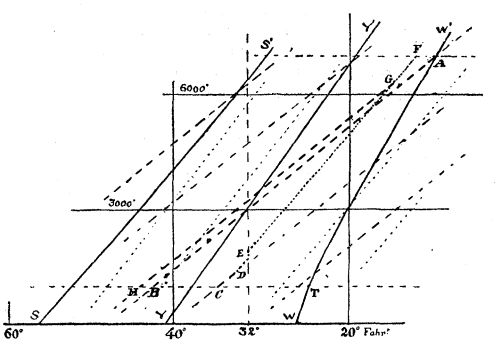
FRED'K SCHWATKA.
New York City.

'Chinook winds.'

Dr. Dawson's interesting note on the Chinook winds of the north-west does not fully represent the views on the origin of the *foehn* held by Dr. Hann.

The *foehn* winds, and presumably the Chinook also, are often felt on the leeward side of a range before any rain falls on the windward side: therefore, while the evolution of latent heat by condensing vapor is a true and important cause of the warmth of the *foehn* in the manner indicated by Dr. Dawson, it is not the first or the only cause, and I think it is not the most efficient cause. Dr. Hann has shown that the first cause of the warmth is the descent of air from the level of the passes and peaks in response to the needs of a low-pressure area on the leeward side of the range; and, as the temperature of the upper air is not greatly lower than that of the surface air in winter (the vertical decrease of temperature in the atmosphere being slow in this season), the descent of the upper air gives it a warmth and dryness that is very abnormal. The *foehn* is indeed, like our north-east winds, a current that is propagated backwards; first, the air is withdrawn from the plains in front of the mountains by the approach of a low-pressure area; then the air in the valleys flows out over the plains; next the upper air descends from the passes into the valleys, warming as it falls; finally the air rises on the farther side of the range, clouds form in it, rain falls from it, and it therefore cools slowly in its ascent; but, as soon as the little cloud that crosses the range is dissolved, the air warms rapidly in its descent; and thus the *foehn* is established. Doubtless the last two processes go on together.

I have used the accompanying figure (based on a diagram by Hertz) to illustrate the *foehn* problem:



the full lines represent the variation of mean temperature with altitude for the year (YY'), summer (SS') and winter (WW'); while the broken lines are ordinary adiabatics, showing the change in temperature of ascending or descending masses of air that are warmer than their dew-point; and the dotted lines are adiabatics for the retarded cooling of masses of air in which vapor is condensing. Now, in winter, when the lower air at a station one thousand feet above the sea, with a temperature of 24° F., (shown at T), moves away, and is replaced by air that descends from an elevation of seven thousand feet, where its temperature is 10° (A), the latter will reach the ground (B) with a temperature about 42°, and a very low relative humidity: it is almost twenty degrees warmer than the air whose place it has taken. The descent must be rapid, or else the air will be much cooled on approaching the cold ground.

A second example shows the action of rain: starting on the farther side of the mountains, with a temperature of 35°, suppose the air ascend five hundred feet from C to D before any condensation takes place; then, clouds forming and rain falling, further cooling is slow, as shown by the steeper dotted line, DF. Where this line crosses the temperature of 32°, there will be a brief ascent without any cooling, until all the cloud-particles are frozen: this is shown by a short vertical turn at E, but the effect is small.

Supposing the air rises to one thousand feet, it will there be cooled to 12°; then descending, as it passes over the range, it will at first (*FG*) warm as slowly as it cooled, until all the cloud that it carries is dissolved; the rest of the descent has a faster warming (*GH*), and the ground is reached with a temperature of about 43°, or 8° warmer than when the ascent began.

These figures are not precise, as the diagram is rather hastily constructed from Hertz's plate; but they serve to show how much greater a change is produced by the descent of the upper air than by the evolution of latent heat in a transmontane wind. The approach of the line of summer temperature (*SS'*) to parallelism with the adiabatics also illustrates how much fainter the *foehn* must be in summer than in winter.

The following quotation from Espy's 'Fourth meteorological report' (1857) is of interest in this connection: "It is known that air, in passing over high mountains, . . . is twenty or thirty degrees warmer than the atmosphere is at the same height over plains, because in passing over them it has the latent caloric in it, just evolved by the condensation of the vapor on the windward side." "Air can never come down from a great height without being very dry when it reaches the surface of the earth." "At the time of this hot south wind, there may be a great rain taking place on the other side of a mountain to the south of the observer, sending its hot air over above, and radiating its abnormal heat down, and even bringing some of the hot air down the slope on the north, which would be felt there as an excessively hot, dry air." He also quotes Lepoy's mention of a warm south-west wind at Fort Simpson, east of the Rocky Mountains in British America, and applies the above explanation to it (pp. 146, 147, 151).

W. M. DAVIS.

Cambridge, Jan. 12.

The claimed wheat and rye hybrid.

There is very slight botanical distinction between the wheat and rye genera, and hence we could scarcely select two genera between which we should more readily expect, *a priori*, a success in hybridization. The question, however, is, Has such a hybridization been effected? Mr. Charles Barnard, who scarcely can speak as a botanist, states in the January *Century*, p. 477, that it has taken place. As one who has carefully studied the published claims, and who has also visited the growing plants upon which the result is claimed, I must beg to dissent. Without opportunity for a careful and thorough examination of the various plants produced, I dare not affirm that such a hybridization has not been effected; yet I do dare affirm that the evidence adduced is insufficient to establish the fact, and is sufficient to establish grave doubts.

What are the facts? The flowers of the Armstrong wheat were treated with pollen from rye. A number of variables were produced from the resulting seed, which, without careful botanical investigation, have been pronounced hybrids. These figures were published in the *Rural New-Yorker* of Aug. 30, 1884.

Lindley distinguishes rye from wheat by its narrow glumes, and constantly twin narrow florets with a membranous abortion between them. In the drawings referred to, the glumes in all the figures are drawn broader than in the rye. In four of the figures the spikelets are distinctly those of a common wheat. In the fifth figure — the one called by Mr. Carman "a distinct grain, neither wheat nor rye, and as different from either as wheat is from rye, or rye from wheat" — we must look for the hybrid, if at all. This plant, so far as can be indistinctly made out from the figure, has its spikelet solitary on each notch of the axis, with two nearly equal glumes; and the outer pale of each floret has at the top either a notch or angle on each side of the terminal point or awn, — all the distinguishing characters of the genus Triticum. It has not the narrow glumes nor the constantly twin narrow florets which are peculiar to rye.

What do these figures resemble, if not rye? Judging by comparison of pictures, his No. 335 is close to the Froment de Saumur; his No. 336, to Froment Pictet; his No. 337, to Froment de Naples; his No. 338, to Froment blanc de Flandre; his No. 339, the supposed hybrid, to Froment de Pologne compact, — all, as figured by Heuze, in the form of the head. I do not mean to say by this that they are these varieties, for the material for judgment does not admit of such close comparison; but I refer to these varieties, and those represented by Mr. Carman's figures, as representing like types of head.

We do not question the attempt at a cross. The variability effected is indication of the influence of a foreign pollen. We can explain the appearances, however, by an hypothesis. Under the stimulus of the rye pollen, atavism has resulted, whereby varieties dormant in the Armstrong wheat have made their appearance; and to those unfamiliar with foreign varieties, whose type appears in the progeny, the seedlings produced seem as if novelties, the unfamiliar Blé de Poland being little known in this country.

The whole subject is, however, too interesting a one to allow to pass without comment such statements as the *Century* article contains, and it is to be hoped that at some time a botanist expert in agricultural botany may have opportunity to investigate a series of these specimens.

E. LEWIS STURTEVANT.

Geneva, N.Y., Jan. 6.

Stepniak's 'Russia under the tzars.'

Will you kindly permit a few words of reply from one of your English readers to M. Woeikof's letter on p. 478 of your issue for Nov. 27, 1885?

We in the old country, who are watching with deep interest the struggle for freedom now going on in Russia, do not attach so much importance as your correspondent seems to think we should, to Stepniak's personal share in the conflict: indeed, we do not even care to inquire about it. The important point for us is the accuracy of the facts he has brought forward. If true, they place the Russian government outside the pale of civilization, and deprive it of all right to appeal to civilized Europe against any act in which the wrath and despair of its subjects may find vent. If false, they can easily be disproved. Stepniak has plainly stated names, dates, and sources of information; his book has now been for a year before the public; and he has reiterated his charges through the leading organ of the English press. If the Russian government is maligned, why does it take no steps to disprove his statements?

But whilst Stepniak's allegations are confirmed by

the most reliable sources of information at our command, they are only challenged by such bitter personalities and trifling evasions as those indulged in by your correspondent. Writing with evident animus, he can find nothing better to object to Stepniak's crushing indictment against the whole system of government in his country than a quibble as to whether a man who escapes from the prison hospital can be said to escape from prison (your readers will find a detailed account of Prince Peter Kropotkin's escape in Stepniak's 'Underground Russia'); and the obvious truism that polite circles at St. Petersburg profess ignorance of cruelties, their master desires to conceal.

Until some better evidence to the contrary than this is laid before us, we English lovers of liberty must consider the case against Russian despotism as proved; and we shall endeavor — not in hatred, but in love, toward the Russian people — to aid them by every means in our power in their heroic efforts to free themselves and their country. C. M. WILSON.

London, Dec. 27.

Ruminants of the Copper-River region, Alaska.

While on the Copper or Atnah River of Alaska, and its principal tributary the Chitina (*Chitty*, copper; *na*, river), I had occasion to learn something of the species of ruminants inhabiting the region. Of the Cervidae, only two species, as far as I had occasion to learn, exist; viz., the moose, Alces machlis, called by the natives tenáyga; and a form of the caribou, Rangifer tarandus, called by the natives honnâi.

Of the Bovidae, there were two species, one of which, called by the natives tebáy, I had occasion to carefully examine. It nearly resembled Dall's mountain sheep (Ovis canadensis Dalli, Nelson), "found in the mountains of Alaska and southward into British America." My party killed several of these animals, one of which, a ram, had horns twenty inches long and nearly straight. It was killed on a very high point, much above the timber-line, and in its fall was considerably crushed. The horns were similar in structure to those of the big-horn, but had very little curvature. I saw a spoon made from a tebáy's horn, which had a length of twenty-six inches, and measured five inches across the bowl. The natives informed me that some had much larger horns than the one that furnished material for this spoon. This may or may not be true.

The head of the tebáy was much like that of a Southdown ram, the muzzle much less sharp than that of Shaw's Ovis canadensis or Nelson's Ovis canadensis Dalli. The hair, as to kind, was in no respect different from that of the latter animal, but was of a uniform white color, and by no means dirty; in fact, was nearly as white as his surroundings of snow. From the best information obtainable, I would class it as an equal in size to the big-horn, and a relative of Dall's mountain sheep. The ram and one other tebáy were killed on the most northerly tributary of the Chitina, called by us Chitistone (Copper-stone) River, on account of the existence there of copper ore.

The natives informed us that a few miles below the junction of this tributary with the Chitina we could kill small tebáy, and four were obtained. Their heads were left on the mountains, but the body seemed identical with that of the Chitistone River specimens, though very much smaller. Why only small ones should be found at this place, in the latter part of April, I cannot say. The mountains here were not so high as farther to the east and north, where the large ones had been killed. The last tebáy seen or heard of by us were near the source of Copper River, on the divide between it and the Tananá River.

The other species of the family was a white animal whose pelt I frequently saw used in articles of wearing-apparel, and which, from its description, was probably the mountain goat, Mazama montana, found also on the head waters of the Yukon River and its upper tributaries. I saw some of these animals at the junction of the Copper and Chitina rivers, on the west banks of the former, but was unable to obtain them. H. T. ALLEN,

Lieut. 2d cavalry, U.S.A.

Washington, Jan. 2.

The festoon cloud.

In the *Philosophical magazine* for July, 1857, Mr. W. S. Jevons, then assayer at the Sydney branch of the royal mint, had an article on the cirrous form of cloud (vol. xiv. 22–35), and gave therein the best early account that I have met with of a peculiar form of cloud, since commonly called the 'festoon' or 'pocky' cloud. He says these forms are often to be seen on the under surface of dense cirro-stratus clouds, 'especially at the front or tail of a thunder-cloud.' Sometimes these dropping portions of cloud, or 'droplets,' as he calls them, seem to come into contact with dry air, when their well-defined form is destroyed, and a fibrous or fur-like appearance only remains. 'They appear to be truly portions of subsiding cloud.' An accompanying 'imaginary section of a thunder-cloud near Sydney' nicely illustrates their attitude, but not their form.

The earliest valuable figure of the festoon cloud is presented in an article by A. Mitchell, on weather prognostics in Scotland, in the Edinburgh *New philosophical journal* (xviii. 1863, 221), where it is copied from a drawing by the Rev. C. Clouston: it is probably the same figure that is given in a work by the latter author, 'An explanation of the popular weather prognostics of Scotland,' etc. (Edinburgh, 1867); but this I have not seen. The drawing shows the cloud to be distinctly convex downwards, the separate festoons being grouped together somewhat like the adjacent grapes on a bunch; and it is spoken of as a sure sign of stormy weather. Its relative rarity may be estimated from a note by Symons, the veteran English observer, in his *Meteorological magazine* for July, 1868. He first saw it early in the morning of a June day in 1858, just before a violent thunder-storm; then during the succeeding ten years he never saw it, or heard of its being seen, till he came upon the book above mentioned. He said it looked like 'bags of sand,' but does not refer to it as a falling cloud.

Poey, a lifelong student of cloud-forms, sent a brief note to *Nature* (Oct. 19, 1871, p. 489), in which he speaks of this cloud as a new form, and gives a rough figure of it: he considers it very rare, having seen it but twice in his life, both times suspended from the pallio-cirrus of thunder storms, — once in Washington, D.C.; again in Beloit, Wis. This note brought out several others; among them one signed 'J.,' evidently by Jevons, calling attention to his

early account; another by Scott, in the *Quarterly journal of the royal meteorological society* (i. 1873, 55–59), in which most of these references are mentioned.

Further attention to the festoons is given in Poey's little book, 'Comment on observe les nuages pour prévoir le temps' (Paris, 1879, 86), and in Ley's review of it in *Nature* (Jan. 1, 1880, 210). The former calls it '*globo-cirrus*,' and traces its first mention back to Lamarck in 1804; but Poey finds only twenty records of the cloud that he can recognize, seventeen of them being connected with storms. Ley calls the festoons *mammato-cumulus* and *mammato-cirrus*, figuring both kinds, and noting that they are certainly not common, although not nearly so rare as is usually supposed. Abercrombie notes that the festoons result from the failure of the ascensional current that is commonly associated with showers and squalls (*Nature*, May 24, 1884).

My object in writing is to ask if the cloud is commonly seen in this country, and if it is then generally associated with the cirro-stratus of thunder-storms, or with the larger storms that are so unfortunate as to have no special name, unless we call them 'areas of low barometer.' My note-books record the festoon clouds twice in Montana in 1883, twice during the past summer of 1885 in Connecticut and New York (all these being in the cirro-stratus cover of the after-part of thunder-storms), again here in Cambridge, on Dec. 13, 1885, about noon, in the pallio-cirrus sheet attending one of the above-named 'areas,' and at a distinctly greater altitude than the low scud and intermediate cirro-stratus clouds that soon closed in, and gave us rain in the afternoon. They seemed in all cases to be gently falling cloud-masses of films, resembling the forms that ink may take when dropped into water; and, when watched attentively, they could be seen to descend and dissolve away. Are they as rare as the notes by Symons and Poey would lead us to think? W. M. DAVIS.

Cambridge, Mass., Jan. 5.

Topographical models or relief-maps.

I must personally thank you for your good words in behalf of non-exaggerated reliefs in your last issue, p. 24. I have had a long experience in this kind of work, and never found a case which required the vertical scale to be exaggerated. No relief of the surface is too delicate to escape the human eye when represented with sufficient skill and care in modelling. The demand for exaggeration in a relief comes from those who will not spend a sufficient amount of time and pains upon the intermediate contour curves, or from those who have not trained themselves in drawing from objects. The habit of exaggerating the relief excuses itself at first on the plea that common people cannot appreciate heights when true to nature, but the fact is that the difficulty is felt by the modeller himself; and when the habit is once formed, it becomes incurable. If a relief-map be not true to nature, what is the good of it? Geologists have been forced to abandon exaggerated cross-sections; why should they permit relief-map makers to revive the discarded error, and put the representation of the whole in antagonism to the representation of the parts?

About the year 1865 or 1866 I made a wooden model of one of our lower Silurian limestone valleys, with its bounding ridges, about 20 miles long. The model was about 18″ by 36″, in 12 bars of wood, each 18″ long by 3″ wide. On each side of each bar I painted the corresponding section of the valley, with its limonite horizons, and faults. The model still exists. My purpose was first to get correct ideas of the country structure for my own work, and then to exhibit my conclusions to the Pennsylvania railroad company, who employed me. The reliefs in the valley were very low; but they were perfectly legible to the eye of a layman. What would have been the fate of my side-sections had I used an exaggerated vertical scale?

In 1865 I made a model of the underground of the Plymouth anthracite mine, with its remarkable vertical fault, from levels which I took in the mine. What good would this have been had I used a different vertical scale?

I have myself made models on several plans; the most satisfactory, but the most laborious, being to draw a good many cross-sections on the same vertical and horizontal scale, along parallel lines, as nearly as possible at right angles to the general strike; then cut strips of wood, lead, zinc, or stiff paper (I have used all four) to represent the cross-sections; set these up in their places; fill in with wax or plaster; and finally tool the surface thus obtained. I prefer this method to the common one of jigging out the contour curves, and filling the terraces between them with slopes of wax. The latter method is easier and less costly; but it is sure to make the modeller slovenly in his geological representation, and it is a powerful seduction towards exaggeration of the vertical scale. Beginners and earnest scholars ought not to be allowed to use this method until they have been drilled to accuracy, and to love the true natural aspect, by the compulsion of the method of cross-sections. I never see a false relief-map without indignation, and a touch of the contempt we feel for all anachronisms. J. P. LESLEY.

Philadelphia, Jan. 10.

The cherry tortrix.

This insect, Cacoecia cerasivorana Fitch, was very common in Michigan the past summer. The most interesting thing about it is the large web or tent which it spins, and in which it usually stays. As it needs more food, it 'ropes in' new twigs, and thus has fresh foliage right at hand. I found that these little caterpillars would deflect a shrub, an inch or more in diameter, several inches, that its leafy branches might be brought into its tent. How do these little larvae exert so much force? I know that entomologists usually say it is by the pulling of the hundreds of larvae as they move their heads back and forth in the operation of spinning; but I do not see how they can pull. As they touch their mouth to the web or twig, the liquid secretion adheres, and quickly hardens into a tough thread; but the larvae do not seem to draw, nor is it certain that the thread would be strong enough so early in its formation to draw with any force. From very careful observation in the laboratory, I was led to believe that it was due to the contracting force of the many hardening silk threads that brought the large twigs together. These larvae are smooth, and must find the web a great protection. The teeth on the chrysalides are of great service in enabling them to push out of the tents, just as the moths are to issue. A. J. COOK.

Lansing, Mich.

SCIENCE.—SUPPLEMENT.

FRIDAY, JANUARY 15, 1886.

THE EIGHT-HOUR DAY.

CONSIDERING the interest which is everywhere awakened in face of the coming determined agitation for an eight-hour day, the pamphlet by H. W. Fabian, on 'Der gesetzliche achtstundige normal-arbeitstag' (*Social science publishing company*, New York), is quite opportune. It constitutes the first number of a cheap series devoted to economic and social questions. Apart from its purpose of concentrating certain facts concerning the development of legislation on this subject, it is perhaps noticeable as indicating the diffusion of the writing and theories of Marx. His philosophy is accepted as laying the basis for state action in economic matters. It is a debated question, even among the labor-leaders, as to whether they will be able to carry into successful operation their plan for the general adoption of the eight-hour day on May 1, 1886. This is the date determined upon by the federation of labor unions of the United States and Canada. Such a thorough-going undertaking has immense difficulties before it, if it is managed simply as an economic movement. Many trades are not thoroughly organized; large numbers of workmen have no savings; and of course, if a general strike in all industries be resorted to, there could be little hope of mutual aid. Again: the system of piece-work is a standing obstacle. This is seen in the case of cigar-makers who work in tenement-houses. Mr. Fabian, therefore, urges the necessity of combined political action: economic forces alone are not sufficient. Those who are perplexed and possibly exasperated by this movement should make themselves familiar with the history of the labor-day. Even so conservative an investigator as Thorold Rogers has shown, that, in battling for the eight-hour day, the workman is only claiming his inheritance which he possessed less than five centuries ago. The demand is not a radical one; and no question was ever more temperately discussed than this at the recent Washington labor congress. For more than a quarter of a century the working-day in Australia has been of but eight hours; and last April the anniversary of its introduction was celebrated by artisans, manufacturers, and government officials. All these united in a declaration of its success.

E. Y.

SHELL-FISH IN CONNECTICUT.

THE 'Fifth report of the shell-fish commissioners of the state of Connecticut,' for 1885, shows that the total area of oyster-grounds, for which application has been made to the commission (or their predecessors in certain places, the town committees) exceeds a hundred and twenty-four thousand acres. This, it is understood, excludes all natural beds or property owned by towns for the common benefit. Of the total, nearly eighty thousand acres have already been granted, of which sixteen thousand two hundred are under cultivation. Such portions of the remainder as are held for speculation, and not cultivated, revert to the state after five years, at the order of court, on a proper showing. In 1885 there were four hundred and twenty-three tax-paying cultivators, and the nominal price fixed on the grounds has yielded the state over fifty thousand dollars. The commissioners recommend the repeal of that section of the law which excludes non-residents from its privileges; as the local oyster-growers have had full opportunity for securing such lands as they could use, and, ignorantly or intentionally, non-residents have secured ownership through a merely fictitious compliance with the letter of the law. Of taxes levied, all but fifty-five dollars have been collected; the tax produced nearly eight thousand dollars the present year, and nearly eighteen thousand dollars during the entire three years. Much available ground still remains open to designation.

The experience of cultivators shows, that with proper dredging vigilantly kept up, and a suitable state supervision of the natural beds, the starfish may be kept under so as to do but little damage. A new pest was reported in the worm Sabellaria vulgaris Verrill, which builds interlocking sand-tubes with great rapidity, which, when numerous enough, smother the oysters on which they rest. One bed containing seventy-eight thousand bushels was nearly destroyed in this way; but it seems that such a result is very rare, as no further serious damage from this cause has been reported, and it is possible the loss in question was over-estimated.

The oyster-fleet of 1885 comprised 49 steamers, with a capacity of 50,525 bushels.

Mr. Bogart, the efficient engineer of the comission, reports on his part of the work, which is chiefly occupied with the survey of the state oyster-grounds, and the determination of bound-

aries of private claims, — often a difficult task, owing to their distance from shore.

The laws relating to shell-fish, passed since the date of the last report, are appended. The only one of general importance makes the rights to oyster-grounds personal estate, and not realty, in settling property of deceased owners.

The example of the state of Connecticut, in full accordance with the business sagacity which characterizes her citizens, might well be followed by other states even more deeply interested in oyster-culture. The natural beds of Maryland and Virginia are being rapidly destroyed for commercial purposes, and only a prompt attention to the subject can secure their rescue from impending destruction.

DATE OF VINTAGE.

M. ANGOT contributes a long discussion of the date of vintage in France to the annals of the *Bureau central météorologique* for 1883, issued with date of 1885. His data for some stations reach back to the fourteenth century, and, for a good number, back well into the eighteenth century. His conclusions may be briefly summarized as follows: 1°. The date of vintage varies greatly from year to year, and may in a single country differ by more than seventy days in different years. 2°. The date of maturity depends chiefly on the vines having received a certain quantity of heat, well determined for each species. 3°. Slight variations in the mean date of vintage are found; but these variations are unlike in neighboring regions, and they show no persistent deterioration of climate. 4°. No relation is found between the date of vintage and the sun-spot cycle. 5°. Abundant vintages occur in rather warm years, with nearly normal rainfall: they are less dependent on a concurrence of favorable conditions than on the absence of frosts, hail, diseases of the vines, etc. 6°. Years of good wine have a notable high temperature from June to September, and generally a slightly deficient rainfall. 7°. Years of poor wine are cool in the summer, with rain a little above the normal. Since 1880, detailed observations have been made on the vintage in France, and in future it will be regularly discussed.

The accompanying cuts are reduced from Angot's plates. Fig. 1 shows the budding of the vine in spring-time, as determined by the arrival of the mean diurnal temperature of 9° C. (48° F.), which is provisionally accepted as the time of the beginning of its vegetation. The position of this isotherm for every ten days of February, March, and April, is given by heavy lines; for some intermediate dates, by finer lines. The epoch of vintage in the autumn is similarly expressed in Fig. 2.

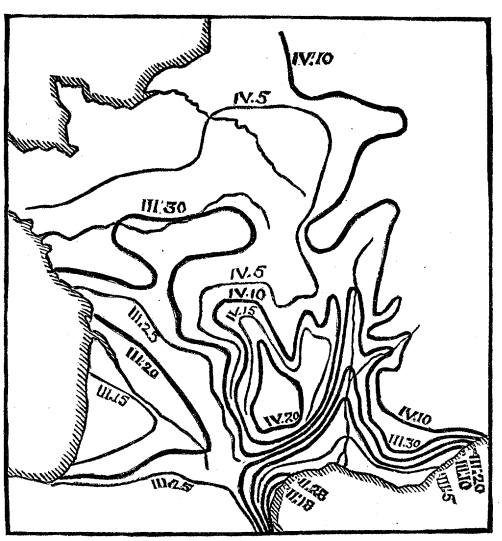


FIG. 1.

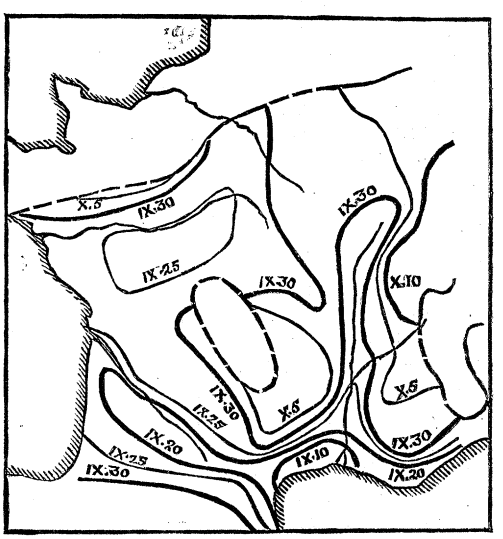


FIG. 2.

The same author has also attacked the distribution of heat on the earth as directly furnished by the sun, giving the basis of what Hann calls the solar climate. Meech is most frequently quoted on this question, and Ferrel has lately discussed it; Angot adds the consideration of various coefficients of atmospheric transparence, and thus makes a step from the theoretical towards the actual. For example: according to Meech, the

heat received in twenty-four hours from the sun on the summer solstice is not greatest at latitude $23\frac{1}{2}°$, where the sun is vertical, but has two maxima farther north, — one at 43° ; the other and greater at the pole, with a faint minimum at 66° ; because the sunshine at the pole through twenty-four hours, at a constant altitude of $23\frac{1}{2}°$, is greater than the sunshine in the twelve-hour day at the tropic, with the sun vertical only at noon. But this gives a very erroneous idea of the temperatures at these latitudes. Now, on the assumption that two or three tenths of a vertical ray are absorbed by the atmosphere, Angot finds the maximum of heat received at the bottom of the atmosphere on the solstice has its maximum at 35°; farther north, the heat received diminishes continuously to the pole, rapidly at first, then slowly beyond the polar circle ; and this is fairly conformable to the distribution of temperature. An interesting calculation shows, that, on account of our less distance from the sun in December than in June, the latitude circle about $2\frac{1}{2}°$ north, and not the equator, receives the same amount of heat on the two solstices : the equator, therefore, belongs in this respect to the southern hemisphere. The memoir is illustrated by an instructive series of curves showing the distribution of heat over the earth at numerous dates. W. M. D.

SODA AND POTASH IN THE FAR WEST.

IN view of the large quantities of soda and potash in various forms that are imported into this country, it is surprising that the abundant supplies of these alkalies within our own borders are not more extensively utilized.

It is probably known to all American geologists that there are extensive deposits of the chloride, sulphate, and carbonate of soda at many points in the arid regions of the far west, which may be had for the trouble of gathering. These deposits occur in the desiccated beds of ancient lakes in Nevada, Arizona, western Utah, and portions of California and New Mexico. There are certain lakes, also, which are valuable brines.

In the basins where evaporation has been nearly or quite complete, the alkaline salts occur either at the surface, when they appear like fields of snow frequently many square miles in extent, or they may be concealed beneath the layers of fine mud known as playa deposits. Again, large areas in Nevada and Arizona are white with alkaline salts that have been brought to the surface in solution, and deposited when the waters evaporated. These efflorescences are frequently rich in sodium carbonate, sulphate, and borate, and have been utilized to a limited extent at a few localities.

The lakes of the far west which are likely to become of commercial value on account of the alkaline salts they contain are Great Salt Lake, Utah ; the Soda Lakes, near Ragtown, Nevada ; Mono and Owen's lakes, California ; and Summer and Abert lakes, in Oregon. All of these are without outlet, and owe their high percentage of mineral matter to the concentration by evaporation of the waters of streams and springs with which they are supplied. Their chemical composition is shown in the following table : —

CONSTITUENTS.	1 Great Salt Lake, Utah (1869).	2 Soda Lake, Nevada (1883).	3 Mono Lake, California (1883).	4 Owen's Lake, California (1876).	5 Abert Lake, Oregon (1883).
Sodium (Na)	49.690	40.919	18.100	21.650	2.773
Potassium (K)	2.407	2.357	1.111	2.751	10.637
Calcium (Ca)	0.255	.....	0.278	trace	.....
Magnesium (Mg)	3.780	0.245	0.125	trace	0.002
Lithium (Li)	trace	.....	.....	trace	.....
Chlorine (Cl)	83.946	40.851	11.610	13.449	8.220
Bromine (Br)	trace	.....	.....	.....	.....
Carbonic acid (CO_3)	.....	16.854	11.465	13.140	4.547
Sulphuric " (SO_4)	9.858	11.857	6.520	9.362	0.497
Phosphoric " (HPO_4)	.....	.....	.....	trace	.....
Nitric " (NO_3)	.....	.....	.....	trace	.....
Boracic " (B_4O_7)	trace	0.286	0.153	trace	.....
Silica (SiO_2)	.....	0.278	0.268	0.164	0.064
Alumina (Al_2O_3)	.....	.....	.....	trace	.....
Total parts per thousand	149.936	113.647	49.630	60.507	26.740

1 Analysis by Prof. O. D. Allen, U. S. geol. explor. of the 40th par., vol. ii. p. 435.

2 Analysis by Dr. T. M. Chatard, Bull. No. 9, U. S. geol. surv., p. 25.

3 *Ibid.*, p. 26.

4 Analysis by Dr. Oscar Loew, Ann. rep. chief of eng., U.S.A., 1876, p. 190.

5 Analysis by Dr. F. W. Taylor, Fourth ann. rep., U. S. geol. surv., 1882–83, p. 454.

It is safe to predict that Great Salt Lake will not only be of great value in the near future on account of the immense quantities of common salt it is capable of producing, but also for the sodium sulphate it contains. When the temperature of the lake-water is reduced to 20° F., the separation of sodium sulphate takes place as a flocculent precipitate, which increases in quantity with decrease of temperature. This should suggest to manufacturers a method of obtaining the salt in a pure state and on a large scale. When the temperature of Great Salt Lake is lowered on the approach of winter, its waters become opalescent, owing to the precipitation of sodium sulphate in an extremely finely divided state. During the winter months the temperature of the air in the region of the lake sometimes falls to 20° or more below 0° F., and at such times the separation of sodium sulphate takes place on an immense scale, and it is thrown up on the shore in thousands

of tons. The amount that could be gathered at such times is practically unlimited. As railroads now touch the shore of the lake, the problem of supplying this salt to manufacturers is simplified.

The Soda Lakes, situated on the Carson desert, Nevada, about fourteen miles east of Wadsworth, have already been utilized as a source of sodium carbonate, which is being shipped to San Francisco. These lakes occupy the craters of extinct volcanoes, and the mineral matter they contain has been derived mainly from the leaching of the lapilli and lacustral deposits surrounding them.

Mono and Owen's lakes are now quite accessible by rail, and are capable of furnishing immense quantities of sodium sulphate and carbonate. From data obtained during a recent survey of Mono Lake, it has been estimated that it contains,

Potassium chloride (KCl).....	8,998,856 tons.
Sodium chloride (NaCl).....	73,524,285 "
Sodium sulphate (Na_2SO_4).....	40.636,089 "
Sodium carbonate (Na_2CO_3).....	78,649,194 "
Total of salts in lake.....	209,233,488 "

It has been estimated by Dr. Oscar Loew that Owen's Lake contains about twenty-two million tons of sodium carbonate, and a little less than one-third of this amount of sodium sulphate.

Summer and Abert lakes, situated in southern Oregon, are remote from railways, but are extremely valuable brines on account of the potash salts they contain. These lakes occupy depressions in the bed of an ancient lake of large size, now nearly desiccated, and are very similar in character. Abert Lake alone has been analyzed, but it is probable that its companion has nearly an identical composition. Abert Lake is about fifteen miles long by five miles broad, and has an average depth (varying with the seasons) of approximately ten feet. Summer Lake is perhaps a third larger, and is also shallow; but its average depth is unknown. The percentage of potassium salts in Abert Lake is greater than in any other lake the composition of which has been published, amounting to five-sevenths of the total of solids in solution.

With these abundant resources at hand, the alkali industry of the far west unquestionably has a great future; and it is to be hoped that it will soon receive the attention that its importance demands. I. C. RUSSELL.

CHOLERA MORTALITY IN EUROPE DURING 1885.

CHOLERA as an epidemic has now for some time almost entirely disappeared from southern Europe, and hence the following results of the serious outbreak of the past year, from the *Lancet* of Dec. 26, will be of interest: From the mainland no further record of cholera is forthcoming; but in the Christina Islands to the south, near the mouth of the Guadiana River, recurrences of the disease are still said to take place. The actual number of deaths recorded in the provinces and cities named is less than that which really occurred; for the official lists were not published with sufficient regularity to insure accurate records day by day, and outbreaks in some localities were never announced at all. The following is the list of places attacked, with their respective cholera mortalities; the capitals of the several provinces being, except where otherwise noted, included for statistical purposes within their provinces: —

Locality.	Deaths.
Province of Castellon..	4582
" Valencia..	13400
" Madrid....	2228
" Murcia....	3580
" Saragossa.	10954
" Cuenca....	2877
" Alicante ..	4361
" Toledo....	2289
" Teruel	493?
" Tarragona.	1258
" Albacete..	2047
" Jean	1398
" Badajoz...	337
" Segovia..	351
" Cadiz	368
" Granada...	9162
" Cordova. .	825
" Almeria...	2514
" Malaga....	635

Locality.	Deaths.
Province of Zamora....	451
" Soria.....	521
" Ciudad Real	905
" Barcelona.	791
" Lerida	821
" Gerona....	215
" Navarre...	2691
" Valladolid	1482
" Guadalajara	261
" Logroño...	541
" Burgos....	199
" Huesca ...	69
" Palencia...	374
" Santander.	194
" Salamanca	84
Aranjuez, pr. of Toledo	835
Gibraltar (English).....	24
Gibraltar (Spanish lines)	191

In France the disease was all but limited to Marseilles and Toulon, and to scattered cases in the south, until November, when an outbreak occurred in Brittany, Brest and its immediate neighborhood being affected. The total cholera deaths at Marseilles were just short of 1,000, and at Toulon just short of 200. The number at Brest has not been made known. In Italy only scattered cases occurred at several places on the mainland; but in the city and province of Palermo, in the island of Sicily, a considerable epidemic occurred, the total mortality there reaching at least 2,430. There was also a rumor of cases as late as the present month in the province of Venice.

BURMAH, PRESENT AND FUTURE.

MR. HOLT HALLETT, in a recent address before the London Society of arts, on 'Burmah,' said: In these days, with foreign competition getting keener every day, and hostile tariffs not only shutting the Europeon markets against us, but in a lesser degree American and English colonies also, with the race for fresh colonies and new markets among European powers, it is of importance that we should avail ourselves of our present opportunity for an inland connection and

commercial alliance with Indo-China and China, and thus acquire new markets of transcendent promise.

Burmah and the Burmese Shan states are highly favored by their geographical position. They lie in the course of the monsoons, and are gifted for the most part with a plentiful rainfall.

The Irrawaddy is a river which discharges about 420,000,000 metric tons of water during the year. The river is about 900 miles in length, the last 240 being in British territory. As far south as Akouk-toung its bed is rocky; farther down it is sandy and muddy. New sand-banks are continually forming, and old ones being removed, which renders it necessary for the steamers plying between Rangoon, Mandalay, and Bhamo, to have a service of pilots upon the river. In the rainy season, steamers and large boats enter the main river from Rangoon by the Pan-Hlaing Creek; but during the dry season they have to descend the Rangoon River for some distance, and proceed by different routes into the Irrawaddy.

The Khyeng-dwen is navigable for the largest boats plying on the Irrawaddy, and for steamers certainly as far north as Kendat, and most likely as far as the rapids which occur a little above the junction of the Ooroo River. A great deal of grain is grown in the lower portion of Khyeng-dwen valley, and likewise in that of the Ooroo, near the sources of which are the serpentine mines. The lower portion of the river passes through a broad, populous, and fertile champaign, and presents an almost continuous horizon of palmyra-groves, always in Burmah a sign of population and culture. From these there is a considerable manufacture of palm sugar. The sugarcane is generally used by the Burmese merely for munching; but, according to Colonel Yule, a little sugar is made from the cane in the neighborhood of Ava.

Bhamo, on the course of the Irrawaddy, is the entrepôt of trade for north-western Yunnan, and will certainly become under our rule a place of great importance, as it is the terminus of the shortest caravan routes into western China. For some time it was proposed by many of our officials to improve the caravan route by the construction of a wheeled road, and even a railway; but subsequent explorations have shown that although Bhamo, which is 430 feet above sea-level, is only 250 miles distant in a direct line from Talifu, yet a railway would have to be 600 miles in length to connect these places. The cost of a railway connection by this route would be at least four times as great as that proposed by Mr. Colquhoun and myself, which, besides, has the great advantage of terminating at a seaport instead of at a town 840 miles up a river, of opening up the whole of central Indo-China, and of passing through a much more fertile and better populated region than would be traversed by the other route. Bhamo will no doubt, before long, be joined by rail, *via* Mandalay, to our Rangoon and Tounghoo railway, and subsequently to the Indian system at Dibrugarh; thus tapping the whole of the passes leading from the west of the Shan states, and completing one of the schemes long ago proposed by my colleague and myself.

The inhabitants of Burmah, owing to the excellence of the climate, are robust and healthy looking. They attain the average length of human life, and children especially thrive in the country. The registration returns show that in Burmah the deaths of children under five years of age are in the proportion of 27 to 85 of the total deaths at all ages, whereas in England they are 40 per cent. Concerning the characteristics and peculiarities of the Burman, much need not be said. His virtues, which are many, and his failings, which are not a few, are much the same here as in every part of his extensive country. He here, as elsewhere, displays much spasmodic energy and general laziness; much love of feasts and shows; much disregard of the sacredness of human life, and much tenderness for the lives of inferior members of the animal kingdom; much arrogance and inconsiderateness when placed in high position; and last, though not least, much general truthfulness, and, among unsophisticated villagers, the very un-oriental trait of being quite unable to tell a specious falsehood, — a trait which is as honorable to himself as it is agreeable to those who have the government of his country. His occupations are cultivation on a small scale and petty trading. Actual poverty is almost unknown, but riches are never accumulated. The Burman is strongly distinguished from the Indian races by his love of sport and amusement, and his strong turn for the ridiculous. The Burman is in every way a marked contrast to the Hindoo. Their women-folk mix freely in all social gatherings on perfectly equal terms, and form a very important factor in society.

Proceeding to speak of British Burmah, Mr. Hallett said that only one-half of the area of that country is culturable, and only one-seventh of that half is under cultivation. Taking the present population at 4,000,000, there is room for 24,000,000 more without overcrowding the province. Even now about 1,000,000 tons of rice are exported every year, after feeding the population, cattle, and elephants.

It is therefore certain, that, if all the reclaimable waste lands were brought into tillage, Burmah would be unrivalled as a granary. The population of British Burmah has increased from 2,747,141 in

1872, to 3,736,771 in 1883. Trade has more than kept pace with the advance of population and revenue, as the following figures will show: In 1874 the imports were £1,859,095, and in 1883, £3,772,887. In 1874 the exports were £3,480,407, and in 1883, £7,039,525. The relative increase of the imports is somewhat greater than the increase in exports; but, with the balance of trade so strongly in favor of the province, its capacity as a consumer of British manufactures is very imperfectly measured by the actual value of the imports. Again: the comparatively small amount of those imports demonstrates conclusively that upper Burmah has acted as an effectual and insurmountable barrier between the port of Rangoon and those illimitable commercial requirements of western China and the Shan states which it has been the hope of the government and merchants alike to ascertain and to satisfy. Rice represents 80 per cent of the total exports. The other chief exports are teak, cotton, jade, petroleum, spices, tobacco, hides, horns, ivory, India-rubber, shellac, cutch, and drugs. Of these, teak forms 7 per cent of the total exports, and cotton 2½ per cent.

The statistics of the province show that one of the chief wants is population, — a want which our connection with India and China would make it easy for Madras, Bengal, and China to supply, thus adding materially to the producing capacity and general prosperity of the province.

SOME RECENT TEXT-BOOKS ON METHODS IN MICROSCOPIC ANATOMY.

THE rapidity of the improvements recently made in methods devised for carrying on all kinds of zoölogical investigations has resulted in the establishment of journals largely, or even exclusively, devoted to the diffusion of information in technic. The amount of valuable experience already acquired over a field much broader than that covered by the older text-books on histology has rendered it imperative that the sources of this widely scattered information should be systematically reviewed with the purpose of collecting its important and really valuable elements, and putting them into a shape convenient for use both by beginners and by such investigators as are wise enough not to waste time by remaining content with the scanty methods and appliances of twenty, or even ten, years ago.

The value of the text-book which summarizes the present acquisitions in this field will depend upon several things, but principally upon the critical knowledge and experience which its author brings to bear on the selection of material, and the method of treating his subject.

Since the publication of the first part of Fol's 'Lehrbuch der vergleichenden mikroskopischen anatomie,'[1] in 1884, there have appeared several books having this general purpose in view. The immediate aims of the three mentioned below[2] are not quite identical: each fills a place not fully occupied by either of the others. The first is primarily intended for the beginner, to whom sources of difficulty and their remedies are explained; the third, while intended first of all for 'the instructed anatomist,' also aims to be of use to the beginner; the second takes a middle ground between the other two, in that it does not aim to be 'an exhaustive treatise of the subject in any of its aspects,' but endeavors to meet 'the every-day needs of a zoölogical laboratory.'

In a small pamphlet of about forty pages, Kükenthal has brought together concise practical directions covering the more important of the recent technical methods employed by zoölogists. The statement in the preface that this little book contains nothing essentially new is realized. At the same time, it meets very satisfactorily the needs of a beginner: for the selections made are, on the whole, judicious; and the descriptions, though brief, are intelligible and to the point. About one-third of the book is devoted to the processes (illustrated) of embedding (chloroform-paraffine), sectioning, and affixing sections; but the space devoted to embedding in gum, albumen, and celloidin, is too brief to be of much service. Its compact and unpretending form puts this little pamphlet within easy reach of every beginner, and those to whom German is no impediment will find it serviceable.

Whitman's work is an immediate outgrowth from his editorial labors, in connection with the department of microscopy in the *American naturalist;* but it is much more than a compilation of matter already published there. Although the book is called '*Methods* in microscopical anatomy,' etc., its scope is somewhat broader than that of the two other works, for '*material* and *methods*' sums up the author's view of the needs of the zoölogical laboratory; and upon both points he aims to be of service.

Part i. deals with general methods, which are

[1] For a review of Fol's book see *Science*, vol. v. p. 510.

[2] *Die mikroskopische technik im zoologischen praktikum.* Von Dr. WILLY KUEKENTHAL. Jena, *Fischer*, 1885. 16°.

Methods of research in microscopical anatomy and embryology. By CHARLES OTIS WHITMAN. Boston, *Cassino*, 1885. 8°.

The microtomist's vade-mecum; a hand-book of the methods of microscopic anatomy. By ARTHUR BOLLES LEE. Philadelphia, *Blakiston*, 1885. 12°.

introduced by a few pages intended to orient the beginner as to the proper sequence of steps in the more difficult work, and to acquaint him with the facts and underlying reasons connected with killing, hardening, and staining. The chapter on reagents (preservative, macerating, decalcifying, etc.) is followed by methods of staining, metallic impregnations, and bleaching. Microtomes, together with their auxiliaries and methods of embedding (freely illustrated), occupy two chapters, and the remaining three of the first part are devoted to methods of fixing serial sections, to mounting media, etc.

The second part, which occupies about half the volume, contains some matter not previously published. About fifty pages are devoted to 'embryological methods.' This chapter furnishes much valuable information, but the arrangement leaves the impression that it is the result of fortuitous reading rather than a methodical search for the most valuable things within the scope of the topic. The chapter on 'Times and places of ovulation' serves at least to call attention to the desirability of a more extensive compilation of the facts hitherto published on this subject, as a means of aiding less experienced students in their search for embryological material. The methods employed in studying karyokinesis during cell-division and in the preparation of nervous tissue are considered separately from 'Histological methods,' without any very apparent reason. The important methods of reconstructing the object from microscopic sections introduced by His, Born, and others, form the concluding chapter, which is followed by an appendix principally devoted to recent methods of injecting.

Although not exhaustive, nor perhaps symmetrically planned, both the matter and the manner of the book commend it to every advanced and advancing zoölogist as well as to beginners; and it is for that very reason that one interested in real scientific progress the more regrets to see a publisher possessed of the idea that his interests demand the production of a book twice as bulky and twice as expensive as it need be.

Lee's book is the outcome of a more pretentious undertaking. The author has desired to produce 'a concise but complete account of all the methods of preparation that have been recommended as useful for the purpose of microscopic anatomy.' Whatever opinion one may entertain about the desirability of a manual framed on so catholic a plan, it must be admitted that the author has brought together an immense amount of material in a compact and handy form, which goes far toward saying it will get used; for the bookmaker who makes books for any but people of superfluous leisure, must make them so that they can be consulted without waste of time.

Notwithstanding a natural prejudice which one experiences when an author declines to use his judgment for the reader's benefit, it must be granted that Lee's work is not edited without discrimination, for the brief but valuable introductions which precede the more important topics show that the author is fully alive to the principles underlying manipulations. The citation of the sources of the formulae gives to the student the requisite opportunity for ready verification and control, and the plan of using serial numbers to indicate the successive sections of the book is economical both for author and reader. The latter would have been spared much time, if a column for page-references had been added in the index.

The 'vade-mecum' is practically without illustrations, and, although supposed to be 'exhaustive,' appears to have ignored the important aids to killing animals in a distended and natural condition which are afforded by certain stupefying reagents, such as nicotine, chloral hydrate, etc.

The author defends the nature of his publication — from which "no process having any claim to scientific status has been rejected, nor any (he trusts) unwittingly omitted" — on the ground that (though "a large proportion of the formulae are quite superseded in modern practice") "some one or other of them may perhaps serve, in some way that cannot now be foreseen, to suggest some new method of value;" and he enforces his opinion by reference to the history of the use of corrosive sublimate. He, however, uses the knife (and how could he fail to?) when he comes to the matter of 'cements and varnishes.' The magnitude of the undertaking has also compelled him to modify his original plan of making the second part traverse the entire field of histology and microscopic zoötomy, "giving the student detailed instructions for the examination of all structures that have hitherto been studied, and thus making him entirely independent of all help from a teacher."

The author, therefore, limits himself in the special part to about one-fourth of his four hundred pages, and considers in it 'only very special cases,' such as cell-division, the microtomy of the human brain, etc. The histological part of the field has received much the larger share of attention, — the nervous system, nerve terminations, sense-organs, being very fully treated, — and the embryological only a fragmentary consideration. For this reason and others, the works of Lee and Whitman supplement each other in such a way that no one actively engaged in microscopic work can afford to dispense with either.

COOKING AND DIETING.

IT was the privilege of the writer of this notice in August, 1884, to listen to a lecture on the chemistry of cookery, given at one of the conferences at the health exhibition in London, by the genial and enthusiastic author of the volume first named. After having personally urged the immediate publication in America, in book form, of his papers then appearing in the *Popular science monthly*, it can only be possible for the present writer to urge American readers to avail themselves of so much valuable information and sound sense, served up with so much entertainment as Mr. Williams furnishes in his manner of presentation, — a manner well calculated to catch the popular eye, but which at first glance may prejudice the scientific reader. A critical reading from the stand-point of a cookery chemist, as well as from that of a chemical cook, has failed to reveal any errors of statement as to the present condition of scientific knowledge on the subject of cookery. There are many doubtful points, it is true; but they are well stated in the volume before us, and the lines on which further research is needed are clearly indicated. The author, himself a living exemplification of the fact that good cookery allows good health and good spirits, is a chemist and metallurgist, a student yet, though he is rather past middle life. He shows himself well acquainted with laboratory methods of experimentation, and also with practical cooking.

In Mrs. Henderson's book one is startled to find recommended as 'diet for the sick' a slice of Boston brownbread, with cream, for breakfast; fricassee of chicken, with potatoes *à la crême*, for dinner; macaroni and tomato-sauce, with pear compote, for tea. Evidently the author means by the sick, invalids and convalescents, people with delicate appetites which need to be tempted by dainty service and pleasant flavors. The book is not one for the hospital nurse, but for the lady companion of invalids and elderly people who cannot take exercise. The recipes seem to be excellent, and the directions for serving so as to increase the enjoyment of the food are admirable in points too often overlooked. The author has endeavored to incorporate the latest theories of diet into the cook-book with an enthusiasm which may prove to be well founded, and which may not. Grape-juice and hot water have become pretty well established: peptonized foods, koumiss, and whole wheat are less certain to hold their own. While the practical part of the book is so worthy of praise, it is to be regretted that the first chapter on the chemical composition of foods had not been omitted, or at least revised by a chemist.

The chemistry of cookery. By W. MATTIEU WILLIAMS. New York, *Appleton*, 1885. 12°.

Diet for the sick. A treatise on the values of foods, their application to special conditions of health and disease, and on the best methods of their preparation. By Mrs. MARY F. HENDERSON. New York, *Harper*, 1885. 12°.

LAST April Mrs. Caroline Dall delivered an address in Washington, D.C., before the Shakspeare club of that city, on which occasion she refuted certain statements made by Mr. Donnelly respecting the 'cipher,' and various assertions of other parties relative to the ancestry, education, and character of the poet. These replies have now been embodied in a volume of some two hundred pages, entitled 'What we really know about Shakspeare' (Boston, *Roberts*, 1885). The author declares that she has endeavored to prepare a work which will show at a glance such facts pertaining to Shakspeare's history as are substantiated by contemporary testimonials and existing documents. In this she has admirably succeeded; but, as her book is intended principally for the use of beginners, it might be as well not to confuse them with theories such as those respecting Anne Hathaway's parentage, and her husband's travels in Germany and Italy. However, aside from a few minor speculations of this nature, the work is an admirable one, which cannot fail to assist the student by reason of its concise chronological arrangement, and the excellent index which terminates the volume. Those who are familiar with the plan of Mr. Tweddell's work, published some thirty years ago, will appreciate the labors of Mrs. Dall; and, in view of this fact, we sincerely trust that Mr. Halliwell-Phillipps will forgive her for misspelling his name whenever she has had occasion to quote it.

IN Grand Lake, Sandy Lake, and other bodies of fresh water in Newfoundland, seals are known to breed in abundance, never visiting the sea. Like habits are said to be found in these animals inhabiting Lake Baikal in central Asia, twelve hundred and eighty feet above sea-level. In a pamphlet by Mr. Harvey, entitled 'Across Newfoundland,' the author is of the belief that these fresh-water lakes of Newfoundland have undergone a gradual change from a previous brackish or salty condition, and that the inhabitants have by degrees adapted themselves to their changed conditions. Grounds for this belief are afforded by the fact that other large bodies of salt water in Newfoundland are during periods of the year cut off from the sea, and might readily become permanently separated.